

1/33

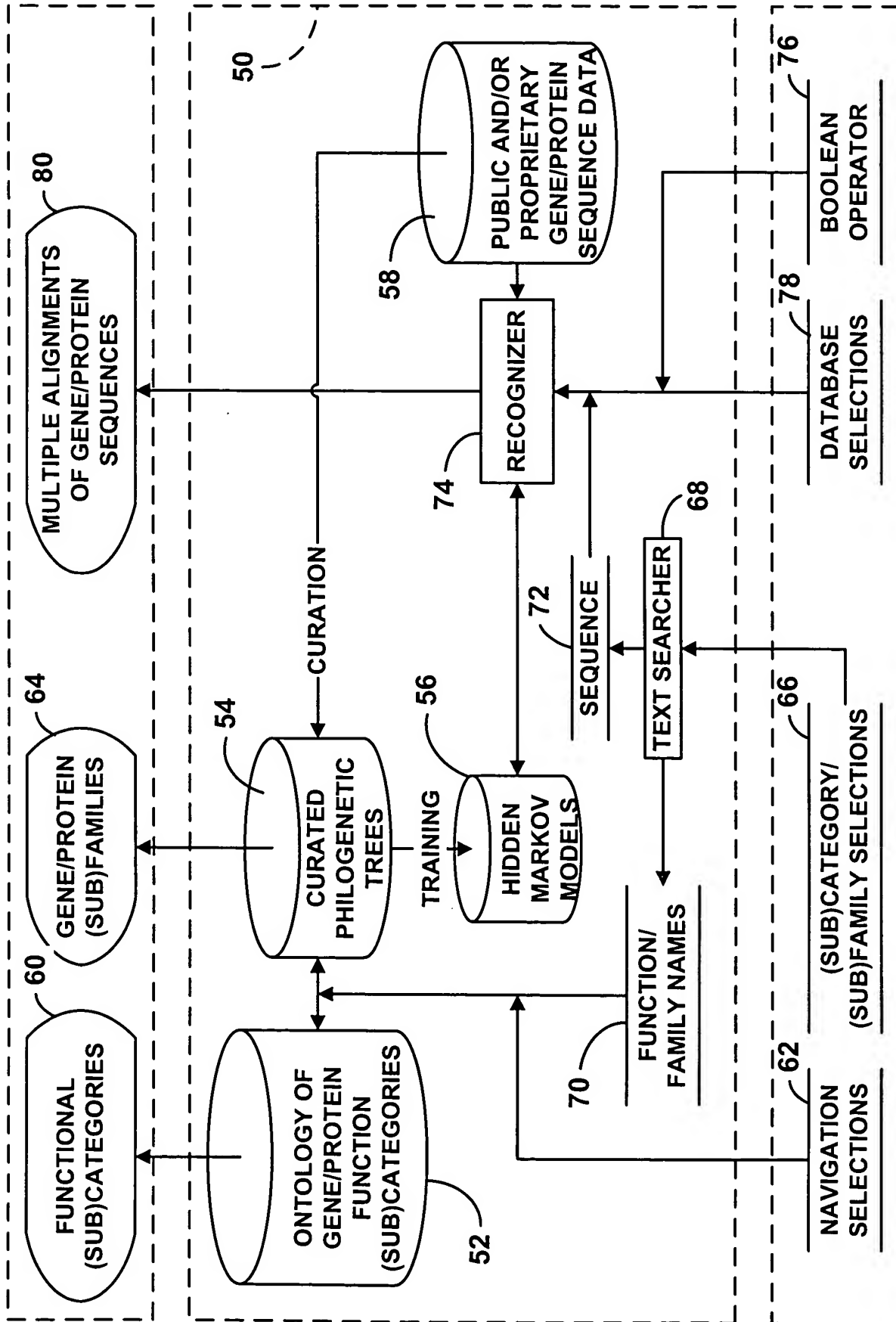


Figure - 1



3/33

http://panther.appliedbiosystems.com/list.jsp?searchType=proviewer&filterLevel=1 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Home Favorites Media

Address: http://panther.appliedbiosystems.com/list.jsp?refresh=10705584593703&btType=1

Enter text to be searched into box and click PANTHER

**PANTHER**  
Classification System

PANTHER gene list: Customize gene list

checked items: Display Gene List Send To Workspace

Display: 10 Update Expanded View Filter By: Panther Molecular Function Filter Advanced Filter

Hits 1-10 of 5414 [ page: (1) 2 3 4 5 6 7 8 9 10 >> ]

on page dr	Gene ID	Gene Name	Panther Best Hit family (Cp) or subfamily (Sf)	Panther Score/Relation	Panther Molecular Function	Panther Biological Process	GeneX Assay	MM00466548 m
1.	LocusID:13424	dynein, cytoplasmic, heavy chain 1 Dnch1	View unavailable to non-CDS users	View unavailable to non-CDS users	Microtubule binding motor protein	General vesicle transport		
2.	LocusID:29489	dynein, cytoplasmic, heavy chain 1 Dnch1	View unavailable to non-CDS users	View unavailable to non-CDS users	Microtubule binding motor protein	General vesicle transport		Rn00570138 m
3.	CG7507	Dynein heavy chain 64C Dnch64C	CYTOPLASMIC DYNEIN HEAVY CHAIN (CF12238:SF9)	-6740.02 ***	Microtubule binding motor protein	General vesicle transport		
4.	LocusID:65209	dynein, cytoplasmic, heavy chain 2 Dnch2	View unavailable to non-CDS users	View unavailable to non-CDS users	Microtubule binding motor protein	General vesicle transport		Rn00576479 m
5.	LocusID:15194	Huntington disease gene homolog Hdh	View unavailable to non-CDS users	View unavailable to non-CDS users	Molecular function unclassified	General vesicle transport Other neuronal activity Apoptosis		
6.	LocusID:3064	huntingtin	View	View unavailable	Molecular function unclassified	General vesicle transport		Hs00169273 m

Start Panther Prom... Microsoft Web... http://panther... My Computer 12:21 PM

Figure - 3

4/33

http://panther.appliedbiosystems.com/list.jsp?searchType=provider&filterLevel=1 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Home Favorites

Address http://panther.appliedbiosystems.com/list.jsp?refresh=1070559459370&listType=1

Go Links

Help Login

Advanced Filter

0.0 Update

GeneX Assay	SNP Assay	Celera SNP ID	Transcript ID	Protein ID	Celera Start Pos	Celera End Pos	Celera Location (chromosome)	Public Start Pos	Public End Pos	Public Location (chromosome)	Species
Mm00466548_m1			XM_109305 (2 transcripts)	XP_109305 (2 proteins)	View unavailable to non-CDS users	View unavailable to non-CDS users	View			12	NCBI: M. musculus
Rn00570138_m1			NM_019226	NP_062099	View unavailable to non-CDS users	View unavailable to non-CDS users	View	133372166	132425699	6	NCBI: R. norvegicus
			CG7507-RA (2 transcripts)	CG7507-PA (2 proteins)	View unavailable to non-CDS users	View unavailable to non-CDS users	View			3L	FlyBase: D. melanogaster
Rn00576479_m1			NM_023024	NP_075413	View unavailable to non-CDS users	View unavailable to non-CDS users	View	4161977	4400166	8	NCBI: R. norvegicus
			XM_132009	XP_132009	View unavailable to non-CDS users	View unavailable to non-CDS users	View	33033473	33181273	5	NCBI: M. musculus
Hs00169273_m1			NM_002111	NP_002102	View	View	View	3112965	3282380	4	NCBI: H.

Start Microsoft Video Panther Prom... http://panthe... My Computer 12:22 PM

Figure - 4

5/33

PANTHER Prowler - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites Media

Address <http://panther.appliedbiosystems.com/prowler.jsp>

**PANTHER**  
Classification System

PLEASE REGISTER TO USE PANTHER

Username: Password: login Register

Home Browse Search My Lists Tools Help Login

Search PANTHER Categories **Intracellular**

OT

- Categories [4/523]
  - Biological Processes [4/252]
    - Amino acid metabolism [0/6]
    - Apoptosis [0/5]
    - Blood circulation and gas exchange [0/3]
    - Carbohydrate metabolism [0/12]
    - Cell cycle [0/7]
    - Cell structure and motility [0/3]
    - Coenzyme and prosthetic group metabolism [0/9]
    - Developmental processes [0/23]
    - Electron transport [0/4]
    - Homeostasis [0/5]
    - Immunity and defense [0/16]
    - Intracellular protein traffic [2/14]
      - Endocytosis [0/4]
      - Exocytosis [0/3]
      - General vesicle transport
      - Lysosome transport
      - Mitochondrial transport
      - Nuclear transport
      - Other intracellular protein traffic
      - Peroxisome transport
    - Lipid, fatty acid and steroid metabolism [0/17]
    - Neuronal activities [0/7]
    - Nitrogen metabolism [0/5]
    - Nucleoside, nucleotide and nucleic acid metabolism [0/30]
    - Phenomena [0/4]

Display Gene List 10 items per page

Step 2. **Transcript/Protein List**

Cell Gene Expression Assay List

NCBI: ☒ H. sapiens ☐ M. musculus ☒ R. norvegicus

FlyBase: ☒ D. melanogaster

SEARCH

Browse: Gene, Transcript, Protein, GenEX Assay, SNP and SNP Assay associated with selected categories/families

Step 1. Select search results list type

Figure - 5

6/33

http://panther.appliedbiosystems.com/list.jsp?searchType=protein&filterLevel=1 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://panther.appliedbiosystems.com/list.jsp?refresh=10705586912390&filterType=2

PANTHER Classification System

PANTHER transcript list: 2 Customize transcript list

checked items: Display Transcript/Protein List Send To Workspace

Display 10 Update Expanded View Filter By Protein ID Filter Advanced Filter

HMM Score Cutoff (s): 0.0 Update

on page dr	Transcript ID	Protein ID	Gene ID	Gene Name	Panther Best Hit family (CF#) or subfamily (SF#)	Panther Score/Relation	Panther Molecular Function	Panther Biological Process	GeneX Assa
1	XM 109305	XP 109305	LOCUSID:13424	dynein, cytoplasmic, heavy chain 1	View unavailable to non-CDS users	View unavailable to non-CDS users	Microtubule binding motor protein	General vesicle transport	Mm00466548
2	NM 030238	NP 084514	LOCUSID:13424	dynein, cytoplasmic, heavy chain 1	View unavailable to non-CDS users	View unavailable to non-CDS users	Microtubule binding motor protein	General vesicle transport	Rn00570138
3	NM 019226	NP 062099	LOCUSID:29489	dynein, cytoplasmic, heavy chain 1	View unavailable to non-CDS users	View unavailable to non-CDS users	Microtubule binding motor protein	General vesicle transport	Rn00570138
4	CG7507-RA	CG7507- PA	CG7507	Dynein heavy chain 64C	View unavailable to non-CDS users	View unavailable to non-CDS users	Microtubule binding motor protein	General vesicle transport	Rn00570138
5	NM 023024	NP 075413	LOCUSID:65209	dynein, cytoplasmic, heavy chain 1	View unavailable to non-CDS users	View unavailable to non-CDS users	Microtubule binding motor protein	General vesicle transport	Rn00570138

Start | Microsoft Word | Microsoft Visio | PANTHER Protein... | http://panther... | My Computer | Internet | 12:25 PM

Figure - 6

7/33

http://panther.appliedbiosystems.com/list.jsp?searchType=protein&filterLevel=1 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Home Favorites Media

Address http://panther.appliedbiosystems.com/list.jsp?refresh=10705586812399&stType=2

Print list

Protein List Send To Workspace

Filter By: Protein ID Filter Advanced Filter

HMMA Score Cutoff (<): 0.0 Update

Gene Name	Panther Best Hit Family (CDS) or Subfamily (SF)	Panther Score/Relation	Panther Molecular Function	Panther Biological Process	GeneX Assay	SNP Assay	Celera SNP ID	Species
main, topoplasmic, heavy chain	View unavailable to non-CDS users	View unavailable to non-CDS users	Microtubule binding motor protein	General vesicle transport				NCBI: M. musculus
1cbcl	View unavailable to non-CDS users	View unavailable to non-CDS users	Microtubule binding motor protein	General vesicle transport	Mm00466548			NCBI: M. musculus
main, topoplasmic, heavy chain	View unavailable to non-CDS users	View unavailable to non-CDS users	Microtubule binding motor protein	General vesicle transport	Rn00570138			NCBI: R. norvegicus
1cbcl	View unavailable to non-CDS users	View unavailable to non-CDS users	Microtubule binding motor protein	General vesicle transport				FlyBase: D. melanogaster
main, topoplasmic, heavy chain	View unavailable to non-CDS users	View unavailable to non-CDS users	Microtubule binding motor protein	General vesicle transport	Rn00576479			NCBI: R. norvegicus
1cbcl	View unavailable to non-CDS users	View unavailable to non-CDS users	Microtubule binding motor protein	General vesicle transport				

Start Internet My Computer http://panther... Microsoft Video... http://panther... 12:25 PM

Figure - 7

8/33

**Celera Discovery System**

search: Categories families/subfamilies apoptosis

Species: ☒ *H. sapiens* ☒ *M. musculus* ☒ *D. melanogaster*

Categories: ☐ Sulfur Metabolism ☐ Signal Transduction ☐ Intracellular Protein Traffic ☐ Protein Targeting and Localization ☐ Transport ☐ Immunity and Defense ☐ Oncogenesis ☐ Neuronal Activities ☐ Muscle Contraction ☐ Blood Clotting ☐ Homeostasis ☐ Sensory Perception ☐ Developmental Processes ☐ Cell Cycle ☐ Blood Circulation and Gas Exchange ☒ Apoptosis ☐ Cell Structure and Motility ☐ Cell Proliferation and Differentiation ☐ Cell Adhesion

Families:

- ☐ CALPAIN THIOLE PROTEASE C2 CF10557
  - Family Tree Full MSA Partial MSA
- ☐ RELAXIN CF1204
  - Family Tree Full MSA Partial MSA
- ☐ WD DOMAIN-CONTAINING PROTEIN CF11554
  - Family Tree Full MSA Partial MSA
- ☐ CASPASE-RELATED CF10454
  - Family Tree Full MSA Partial MSA
- ☐ INTERLEUKIN 6 CF11455
  - Family Tree Full MSA Partial MSA
- ☐ INTERLEUKIN 4 CF11456
  - Family Tree Full MSA Partial MSA
- ☐ TRANSCRIPTION FACTOR ETS-RELATED CF11849
  - ☐ ETS-RELATED PROTEIN (SF11)
  - ☐ ETS DNA-BINDING PROTEIN (SF2)
  - ☐ ETS-RELATED PROTEIN TEL (SF6)
  - ☐ TRANSCRIPTION FACTOR TEL 2 (SF4)
  - ☐ CETS-2-RELATED (SF1)
  - ☐ gb def. lin-1 [caenorhabditis elegans] (SF0)
  - ☐ ETS DOMAIN PROTEIN ELK-4 (SF13)
  - ☐ ETS-DOMAIN PROTEIN ELK-1 (SF14)
  - ☐ CETS-1 PROTEIN (SF7)
  - ☐ ETS-2 TRANSCRIPTION FACTOR (SF1)

Figure - 8

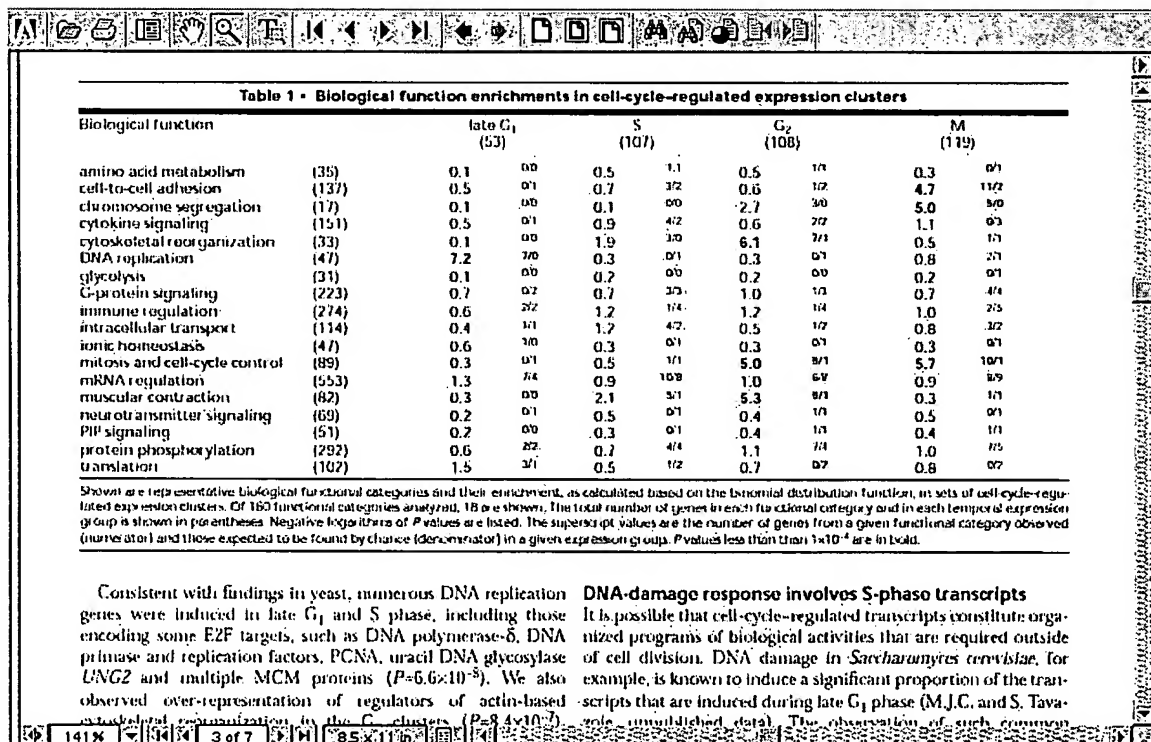


Figure - 9



9/33

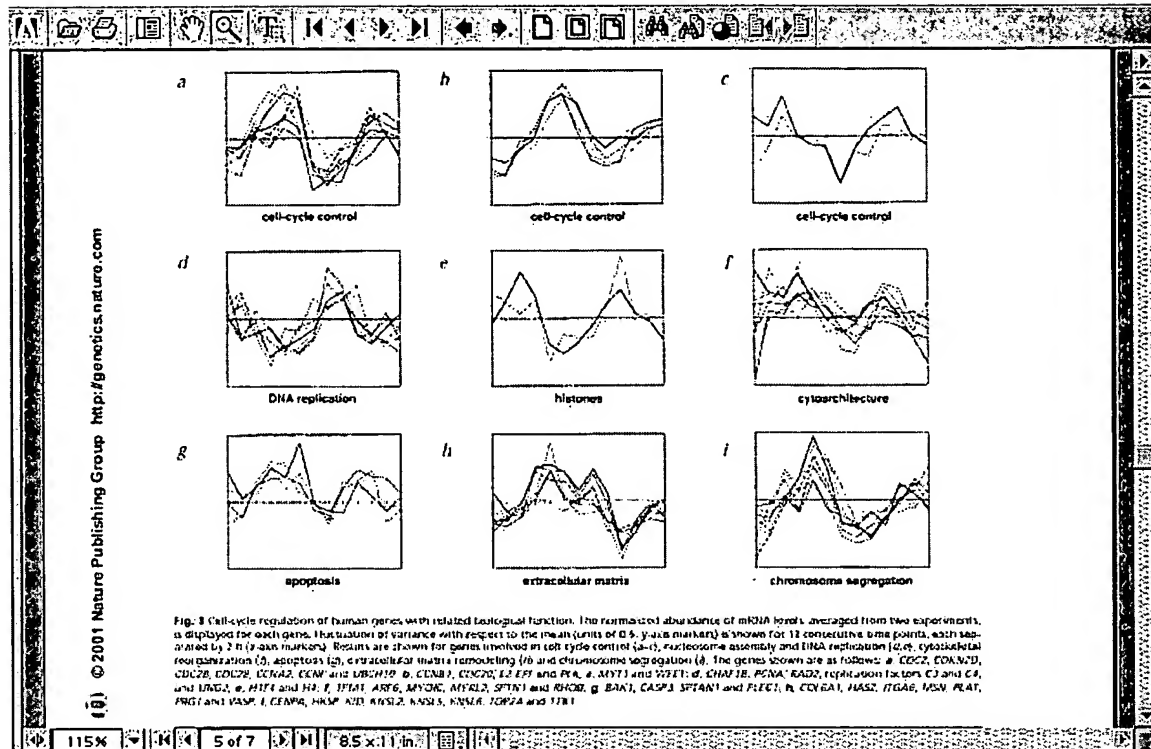


Figure - 10

Table 19. Number of proteins assigned to selected Panther families or subfamilies in *H. sapiens* (H), *D. melanogaster* (F), *C. elegans* (W), *S. cerevisiae* (Y), and *A. thaliana* (A).

Panther family/subfamily	H	F	W	Y	A
<b>Neural structure, function, development</b>					
Epidermal growth factor receptor	1	0	0	0	0
Ion channels					
Acetylcholine receptor	17	12	56	0	0
Amiloride-sensitive cation channel	11	24	27	0	0
CNG/AC	22	9	9	0	30
IRK	16	3	3	0	0
ITP/ryanodine	10	2	4	0	0
Neurotransmitter-gated	61	51	59	0	19
P2X purinoceptor	10	0	0	0	0
TASK	12	12	48	1	5
Transient receptor	15	3	3	1	0
Voltage-gated Ca <sup>2+</sup> alpha	22	4	8	2	2
Voltage-gated Ca <sup>2+</sup> alpha-2	10	3	2	0	0
Voltage-gated Ca <sup>2+</sup> beta	5	2	2	0	0
Voltage-gated Ca <sup>2+</sup> gamma	1	0	0	0	0
Voltage-gated K <sup>+</sup> alpha	33	5	11	0	0
Voltage-gated KQT	6	2	3	0	0
Voltage-gated Na <sup>+</sup>	11	4	4	9	1
Myelin basic protein	1	0	0	0	0
Myelin PO	5	0	0	0	0
Myelin proteolipid	3	1	0	0	0
Myelin oligodendrocyte glycoprotein	1	0	0	0	0
Neurotrophin	2	0	0	0	0
Plexin	9	2	0	0	0
Semaphorin	22	6	2	0	0
Synaptotagmin	10	3	3	0	0
<b>Immune response</b>					
Defensin	3	0	0	0	0
Cytokines	86	14	1	0	0
GCSF	1	0	0	0	0
GM-CSF	1	0	0	0	0
Interferon alpha	15	0	0	0	0
Interferon beta	5	0	0	0	0
Interferon gamma	8	0	0	0	0
Interleukin	26	1	1	0	0
Leukemia inhibitory factor	1	0	0	0	0
M-CSF	1	0	0	0	0
Peptidoglycan recognition protein	2	13	0	0	0
Pre-B cell enhancing factor	1	0	0	0	0
Small inducible cytokine A	14	0	0	0	0
SI cytokine	2	0	0	0	0
TNF	9	0	0	0	0

Figure - 11

10/33

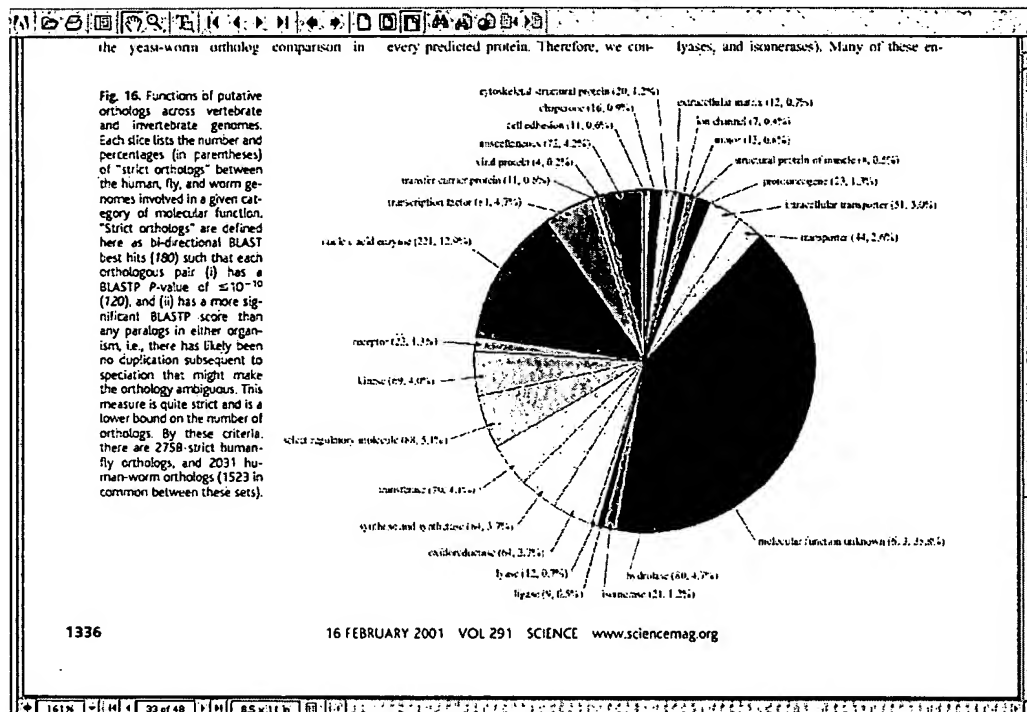


Figure - 12

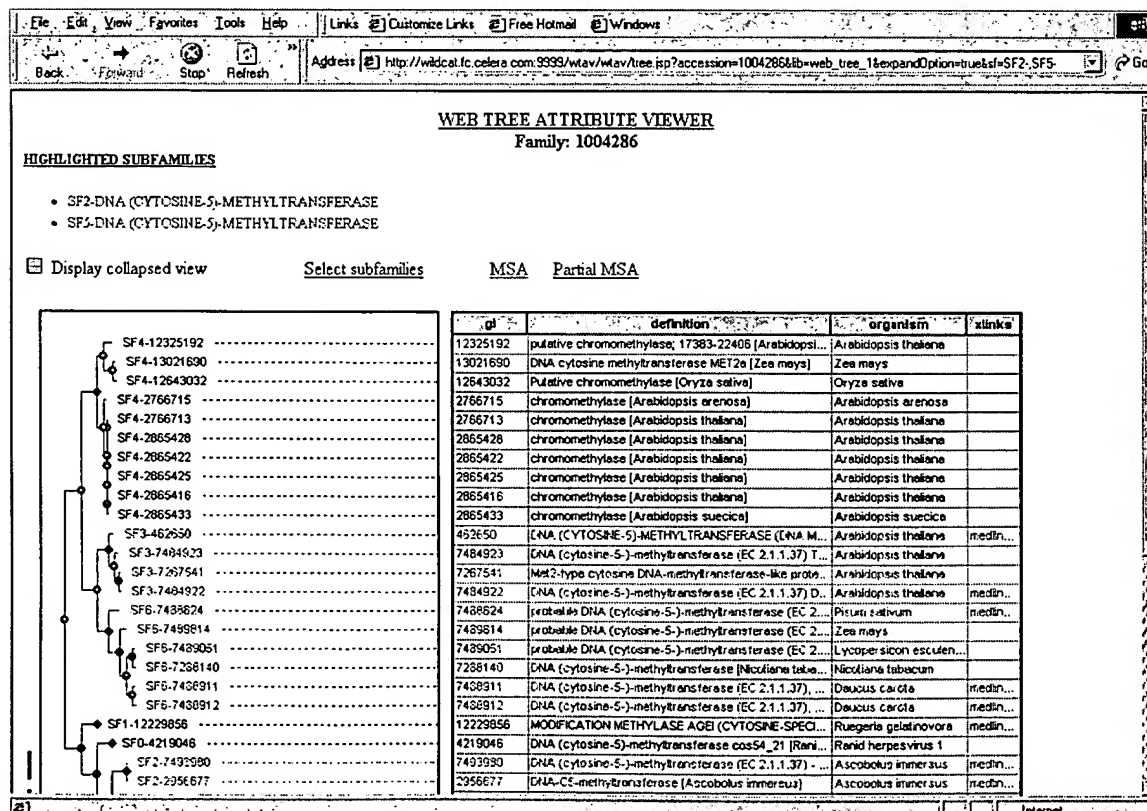


Figure - 13

BEST AVAILABLE COPY

11/33

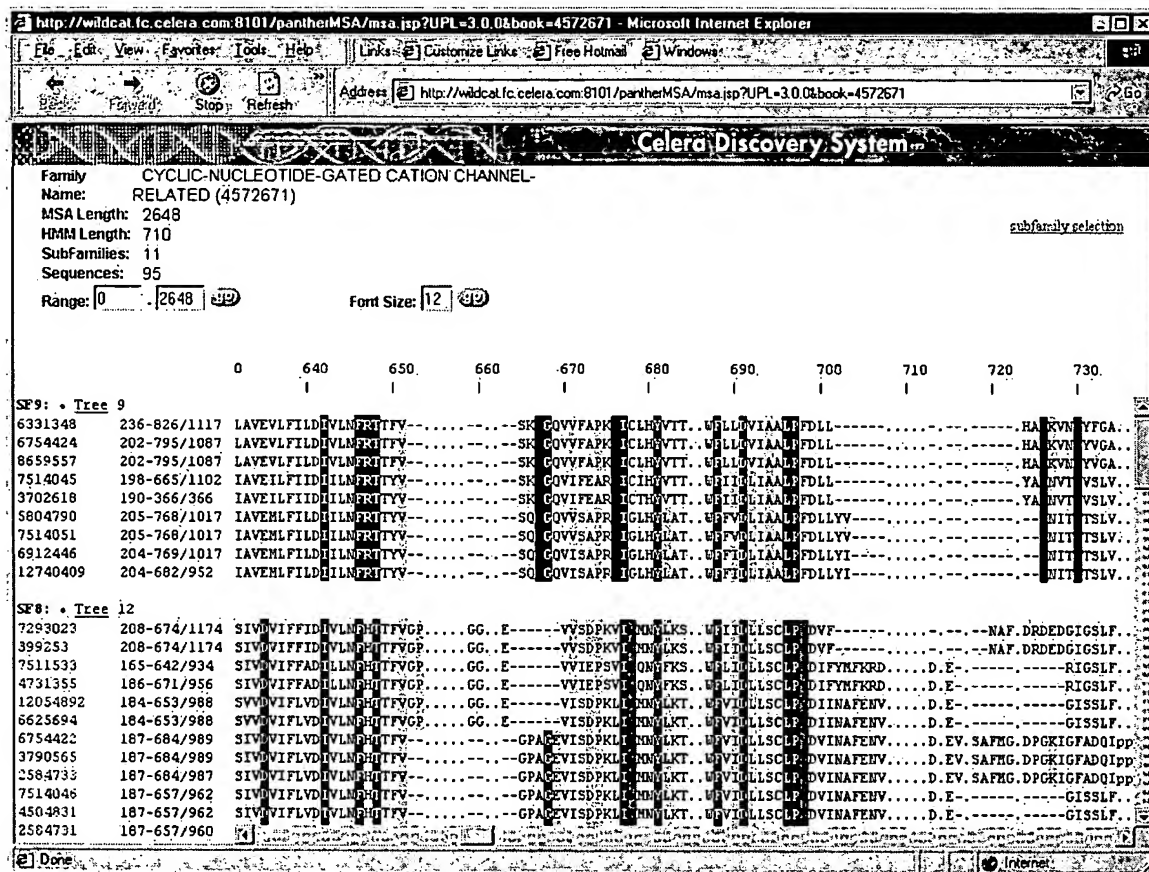



Figure - 14

BEST AVAILABLE COPY

12/33

PANTHER: Celera Protein Informatics - Microsoft Internet Explorer		
<div> <div>FileEditViewFavoritesToolsHelp</div> <div> <div>Links</div> <div>Customize Links</div> <div>Free Hotmail</div> <div>Windows</div> </div> </div> <div> <div>BackForwardStopRefresh</div> <div>Address</div> <div>http://dsc191a.celera.com/pwi-dev/jam/pantherReport.jsp?accession=CP39928&amp;version=20</div> </div>		
PANTHER Discovery Zone		
Panther Classification		
Protein Sequence : <u>CP39928</u>		
Family	Subfamily	SAM NLL NULL score
<u>CYCLIC-NUCLEOTIDE-GATED CATION CHANNEL-RELATED(2129627)</u> 	gb def (ae003455) cg17922 gene product [drosophila melanogaster](2129627.SF1)	-875.46
	<u>CYCLIC-NUCLEOTIDE-GATED CATION CHANNEL (2129627.SF2)</u>	-390.97
	<u>CYCLIC-NUCLEOTIDE-GATED CATION CHANNEL (2129627.SF7)</u>	-340.45
	<u>CYCLIC-NUCLEOTIDE-GATED CATION CHANNEL (2129627.SF9)</u>	-301.98
	Family Level Hit	-235.26
	<u>CYCLIC-NUCLEOTIDE-GATED CATION CHANNEL (2129627.SF5)</u>	-217.94
	<u>CYCLIC-NUCLEOTIDE-GATED CATION CHANNEL (2129627.SF4)</u>	-163.58

**Figure - 15**

13/33

Q04771.cwated.tata - TreeAttributeViewer

File Edit View Tree Attributes Other Help

gi	definition	organism	molecular function	comment
12737603	SERINE/THREONINE-PROTEIN KINASE RECEPTOR R3 PREC...	Homo sap...	serine/threonine prote...	
4557243	activin A receptor type I-like 1 [Homo sapiens]	Homo sap...	serine/threonine prote...	
11967973	activin receptor like kinase 1 [Rattus norvegicus]	Rattus no...	serine/threonine prote...	
417219	SERINE/THREONINE-PROTEIN KINASE RECEPTOR R3 PREC...	Rattus no...	serine/threonine prote...	
6752958	SERINE/THREONINE-PROTEIN KINASE RECEPTOR R3 PREC...	Mus mus...	serine/threonine prote...	
2137132	ALK-1 - mouse	Mus mus...	serine/threonine prote...	
3170092	activin receptor-like kinase 0 [Danio rerio]	Danio rerio	serine/threonine prote...	
3864203	type I serine-threonine kinase receptor [Danio rerio]	Danio rerio	serine/threonine prote...	
417217	ACTIVIN RECEPTOR TYPE I PRECURSOR (ACTR-I) (SERINE/...	Rattus no...	serine/threonine prote...	
6680628	ACTIVIN RECEPTOR TYPE I PRECURSOR (ACTR-I) (SERINE/...	Mus mus...	serine/threonine prote...	
4501895	ACTIVIN RECEPTOR TYPE I PRECURSOR (ACTR-I) (SERINE/...	Homo sap...	serine/threonine prote...	
2499655	ACTIVIN RECEPTOR TYPE I PRECURSOR (ACTR-I) (SERINE/...	Bot tauru...	serine/threonine prote...	
4090422	type I TOF B receptor [Gallus gallus]	Gallus gal...	serine/threonine prote...	
1850764	activin type I receptor [Xenopus laevis]	Xenopus l...	serine/threonine prote...	
2439947	activin receptor like kinase-2 [Xenopus laevis]	Xenopus l...	serine/threonine prote...	
2654757	ALK-2 receptor [Xenopus laevis]	Xenopus l...	serine/threonine prote...	
4525516	BMP receptor IB [Danio rerio]	Danio rerio	serine/threonine prote...	
6164916	bone morphogenetic protein receptor IB; BMP receptor IB [C...	Columbic...	serine/threonine prote...	
1730049	BONE MORPHOGENETIC PROTEIN RECEPTOR TYPE IB PRE...	Gallus gal...	serine/threonine prote...	
4502431	BONE MORPHOGENETIC PROTEIN RECEPTOR TYPE IB PRE...	Homo sapi...	serine/threonine prote...	
6580802	BONE MORPHOGENETIC PROTEIN RECEPTOR TYPE IB PRE...	Mus mus...	serine/threonine prote...	
1083796	serine/threonine kinase receptor - rat	Rattus no...	serine/threonine prote...	
3551073	type I serine/threonine kinase receptor [Danio rerio]	Danio rerio	serine/threonine prote...	
2446992	BMP receptor [Xenopus laevis]	Xenopus l...	serine/threonine prote...	
627262	BMP receptor precursor - African clawed frog	Xenopus l...	serine/threonine prote...	
2446990	BMP receptor [Xenopus laevis]	Xenopus l...	serine/threonine prote...	
6164916	bone morphogenetic protein receptor IA; BMP receptor IA [...]	Columbic...	serine/threonine prote...	
1237261	protein kinase	Gallus gal...	serine/threonine prote...	
11430412	bone morphogenetic protein receptor, type IA precursor [H...	Homo sap...	serine/threonine prote...	
4757854	BONE MORPHOGENETIC PROTEIN RECEPTOR TYPE IA PRE...	Homo sap...	serine/threonine prote...	
1083608	bone morphogenetic protein type IA receptor precursor - rat	Rattus no...	serine/threonine prote...	
547779	BONE MORPHOGENETIC PROTEIN RECEPTOR TYPE IA PRE...	Mus mus...	serine/threonine prote...	
6753194	bone morphogenetic protein receptor, type 1A [Mus muscul...	Mus mus...	serine/threonine prote...	
7303968	babo gene product [Drosophila melanogaster]	Drosophila...	serine/threonine prote...	
1079139	serine/threonine kinase Atr-1 - fruit fly [Drosophila melanog...	Drosophila...	serine/threonine prote...	
7340354	receptor kinase-1 precursor [Schistosoma mansoni]	Schistosoma...	CURRENTLY UNCLAS...	

Ready

Figure - 16

14/33

**Panther Protein Function-Family Browser**

Search: ☒ Categories ☐ Families

Species (genelist): ☒ *H.sapiens* ☒ *M.musculus* ☒ *D.melanogaster*

Categories: ☒ **update families** ☐ or ☐ and ☐ Families: ☒ **update categories** ☐ **go to genelist**

1. Select categories below.  
2. Click on "Update Families" button to view associated data.  
Selecting the "+" expands and "-" collapses categories.

1. Select families and or subfamilies below.  
2. Click on "Go to Genelist" button to view associated genes.  
Highlighted subfamilies correspond to matches with your selected categories.

☒ Molecular Functions - 0

☒ Biological Processes - 15

- ☒ Carbohydrate metabolism
- ☒ Amino-acid metabolism
- ☒ Lipid, fatty acid and steroid metabolism
  - ☒ Fatty acid metabolism
  - ☒ Steroid metabolism
    - ☐ Lipid metabolism
    - ☐ Phospholipid metabolism
    - ☐ Lipid and fatty acid binding
    - ☐ Regulation of lipid, fatty acid and steroid metabolism
    - ☐ Lipid and fatty acid transport
    - ☐ Other lipid, fatty acid and steroid metabolism
- ☒ Nucleoside, nucleotide and nucleic acid metabolism
- ☒ Protein metabolism and modification
- ☒ Electron transport

**Figure - 17**

**Panther Protein Function-Family Browser**

Search: ☒ Categories ☐ Families

Species (genelist): ☒ *H.sapiens* ☒ *M.musculus* ☒ *D.melanogaster*

Categories: ☒ **update families** ☐ or ☐ and ☐ Families: ☒ **update categories** ☐ **go to genelist**

1. Select categories below.  
2. Click on "Update Families" button to view associated data.  
Selecting the "+" expands and "-" collapses categories.

1. Select families and or subfamilies below.  
2. Click on "Go to Genelist" button to view associated genes.  
Highlighted subfamilies correspond to matches with your selected categories.

☒ Molecular Functions - 0

☒ Biological Processes - 15

- ☒ Carbohydrate metabolism
- ☒ Amino-acid metabolism
- ☒ Lipid, fatty acid and steroid metabolism
  - ☒ Fatty acid metabolism
  - ☒ Steroid metabolism
    - ☐ Lipid metabolism
    - ☐ Phospholipid metabolism
    - ☐ Lipid and fatty acid binding
    - ☐ Regulation of lipid, fatty acid and steroid metabolism
    - ☐ Lipid and fatty acid transport
    - ☐ Other lipid, fatty acid and steroid metabolism
- ☒ Nucleoside, nucleotide and nucleic acid metabolism
- ☒ Protein metabolism and modification
- ☒ Electron transport

☒ APOLIPOPROTEIN - CF11428 (7/8)  
Family Tree Full MSA Partial MSA

☒ DIPHOSPHOMEVALONATE DECARBOXYLASE-RELATED - CF10977 (1)  
Family Tree Full MSA Partial MSA

☒ FATTY ACID DESATURASE - CF10486 (5/5)  
Family Tree Full MSA Partial MSA

☒ N-ACETYLGLUCOSAMINYL TRANSFERASE COMPONENT GPI1-RELAT  
Family Tree Full MSA Partial MSA

☒ ACYL-COENZYME A OXIDASE-RELATED - CF11520 (15/20)  
Family Tree Full MSA Partial MSA

☒ PATCHED PROTEIN-RELATED - CF10482 (2/8)  
Family Tree Full MSA Partial MSA

☒ OXYSTEROL BINDING PROTEIN-RELATED - CF10972 (7/10)  
Family Tree Full MSA Partial MSA

☒ 3 BETA-HYDROXYSTEROID DEHYDROGENASE-RELATED - CF11580  
Family Tree Full MSA Partial MSA

☒ CYTOCHROME P450 - CF11971 (8/196)  
Family Tree Full MSA Partial MSA

☒ HYDROXYMETHYLGLUTARYL-COA SYNTHASE-RELATED - CF11877  
Family Tree Full MSA Partial MSA


**Figure - 18**

BEST AVAILABLE COPY

15/33

Function-Family Browser : Panther Gene List ? HMM Score Cutoff (<):  Display:  [update](#) [export](#)

• Sort results by selecting column title. Columns will sort in descending or ascending order.

	ID - Protein	Panther Best Hit • Panther ID family (CF#) or subfamily (SF#)	Panther Score/Relation	Species
<input type="checkbox"/>	345. <a href="#">gene1</a>	<a href="#">ORPHAN NUCLEAR HORMONE RECEPTOR LRH (CF11154:SF208)</a>	<a href="#">-641.6</a>	●●● <i>H. sapiens</i>
<input type="checkbox"/>	346. <a href="#">gene2</a>	<a href="#">ORPHAN NUCLEAR HORMONE RECEPTOR LRH (CF11154:SF208)</a>	<a href="#">-641.51</a>	●●● <i>H. sapiens</i>
<input type="checkbox"/>	347. <a href="#">gene3</a>	<a href="#">RETINOIC ACID RECEPTOR RXR-ALPHA (CF11154:SF216)</a>	<a href="#">-670.15</a>	●●● <i>H. sapiens</i>
<input type="checkbox"/>	348. <a href="#">gene4</a>	<a href="#">RETINOIC ACID RECEPTOR RXR-GAMMA (CF11154:SF217)</a>	<a href="#">-623.86</a>	●●● <i>H. sapiens</i>
<input type="checkbox"/>	349. <a href="#">gene5</a>	<a href="#">RETINOIC ACID RECEPTOR RXR-BETA (CF11154:SF218)</a>	<a href="#">-611.24</a>	●●● <i>H. sapiens</i>
<input type="checkbox"/>	350. <a href="#">gene6</a>	<a href="#">PHOSPHOLIPASE D1 (CF11198:SF4)</a>	<a href="#">-2100.67</a>	●●● <i>H. sapiens</i>
<input type="checkbox"/>	351. <a href="#">gene7</a>	<a href="#">PHOSPHOLIPASE D2 (CF11198:SF5)</a>	<a href="#">-2047.31</a>	●●● <i>H. sapiens</i>
<input type="checkbox"/>	352. <a href="#">gene8</a>	<a href="#">INOSITOL PHOSPHATASE SKIP (CF11200:SF21)</a>	<a href="#">-361.22</a>	●●● <i>H. sapiens</i>
<input type="checkbox"/>	353. <a href="#">gene9</a>	<a href="#">INOSITOL PHOSPHATASE SKIP (CF11200:SF21)</a>	<a href="#">-343.71</a>	●●● <i>H. sapiens</i>
<input type="checkbox"/>	354. <a href="#">gene10</a>	<a href="#">INOSITOL PHOSPHATASE SKIP-RELATED (CF11200:SF22)</a>	<a href="#">-389.15</a>	●●● <i>D. melanogaster</i>
<input type="checkbox"/>	355. <a href="#">gene11</a>	<a href="#">INOSITOL PHOSPHATASE SKIP-RELATED (CF11200:SF22)</a>	<a href="#">-354.86</a>	●●● <i>D. melanogaster</i>
<input type="checkbox"/>	356. <a href="#">gene12</a>	<a href="#">SPHINGOSINE PHOSPHATE LYASE-RELATED (CF11253:SF10)</a>	<a href="#">-722.67</a>	●●● <i>D. melanogaster</i>
<input type="checkbox"/>	357. <a href="#">gene13</a>	<a href="#">SPHINGOSINE PHOSPHATE LYASE-RELATED (CF11253:SF10)</a>	<a href="#">-722.67</a>	●●● <i>D. melanogaster</i>
<input type="checkbox"/>	358. <a href="#">gene14</a>	<a href="#">SPHINGOSINE PHOSPHATE LYASE-RELATED (CF11253:SF10)</a>	<a href="#">-697.26</a>	●●● <i>H. sapiens</i>
<input type="checkbox"/>	359. <a href="#">gene15</a>	<a href="#">DIACYLGLYCEROL KINASE EPSILON (CF11255:SF12)</a>	<a href="#">-997.86</a>	●●● <i>H. sapiens</i>

**Figure - 19**

**Panther Multiple-Sequence Alignment Viewer** • [close window](#)

Family Name : (CF11428)

Subfamilies : 3/3 • Sequences : 93/93 • MSA Length : 552 • HMM Length : 273 (25-382)

MSA Display: 1 - 552 • Font Size: 9 x - +

Select subfamilies	MSA Position:	HMM Position:	
2388609	1-317/317	1	ITKVQELTLEESEKVKAYREELEAQLGQVQTOETQARLSKELOA...AQARVGADIEDVR...NRILVYRSEVNHlggtCEELRSRLASHLRKLRKRL
461527	1-317/317	1	ITKVQELTLEESEKVKAYREELEAQLGQVQTOETQARLSKELOA...AQARVGADIEDVR...NRILVYRSEVNHlggtCEELRSRLASHLRKLRKRL
7441520	1-315/316	1	ITVQVIGELTVLHEETKEKVKAYREELEGLQAQETOQARVSKELOA...AQARLGSDIEDLR...NRLAAYRSEVQAHlggsCEELRARHASHLRKLRKRL
2113992	1-315/316	1	ITVQVIGELTVLHEETKEKVKAYREELEGLQAQETOQARVSKELOA...AQARLGSDIEDLR...GLLAAYRSEVQAHlggsCEELRARHASHLRKLRKRL
416629	1-315/316	1	ITVQVIGELTVLHEETKEKVKAYREELEGLQAQETOQARVSKELOA...AQARLGSDIEDLR...NRLAAYRSEVQAHlggsCEELRARHASHLRKLRKRL
10644783	1-312/313	1	ISQVQTELTVLHEETKEKVKAYREELEGLQDQETOQARLSKELOA...AQARLGADIEDVR...TRLAAYRSEVTHlggsCEELRARLSHRLRGRKRL
3913071	1-107/107	1	ISQVQTELTALMDTEKELKAYKSELEEQLSVAEETRARLSKELOA...AQARLGADIEDVR...SRLAAYRSEVQAHlggsCEELRARLASHLRKLRKRL
114040	1-316/317	1	ISQVQTELTALMDTEKELKAYKSELEEQLSVAEETRARLSKELOA...AQARLGADIEDVR...SRLVYRSEVQAHlggsCEELRARLASHLRKLRKRL
114042	1-316/317	1	ISQVQTELTALMDTEKELKAYKSELEEQLSVAEETRARLSKELOA...AQARLGADIEDVR...SRLVYRSEVQAHlggsCEELRARLASHLRKLRKRL
3913070	1-107/107	1	ISQVQTELTALMDTEKELKAYKSELEEQLSVAEETRARLSKELOA...AQARLGADIEDVR...SRLVYRSEVQAHlggsCEELRARLASHLRKLRKRL
11066430	1-316/317	1	ISQVQTELTALMDTEKELKAYKSELEEQLSVAEETRARLSKELOA...AQARLGADIEDVR...SRLVYRSEVQAHlggsCEELRARLASHLRKLRKRL
178853	1-316/317	1	ISQVQTELTALMDTEKELKAYKSELEEQLSVAEETRARLSKELOA...AQARLGADIEDVR...SRLVYRSEVQAHlggsCEELRARLASHLRKLRKRL
4557325	1-316/317	1	ISQVQTELTALMDTEKELKAYKSELEEQLSVAEETRARLSKELOA...AQARLGADIEDVR...SRLVYRSEVQAHlggsCEELRARLASHLRKLRKRL
178849	1-316/317	1	ISQVQTELTALMDTEKELKAYKSELEEQLSVAEETRARLSKELOA...AQARLGADIEDVR...SRLVYRSEVQAHlggsCEELRARLASHLRKLRKRL
11066425	1-316/317	1	ISQVQTELTALMDTEKELKAYKSELEEQLSVAEETRARLSKELOA...AQARLGADIEDVR...SRLVYRSEVQAHlggsCEELRARLASHLRKLRKRL
11034803	1-316/317	1	ISQVQTELTALMDTEKELKAYKSELEEQLSVAEETRARLSKELOA...AQARLGADIEDVR...SRLVYRSEVQAHlggsCEELRARLASHLRKLRKRL
11066420	1-316/317	1	ISQVQTELTALMDTEKELKAYKSELEEQLSVAEETRARLSKELOA...AQARLGADIEDVR...SRLVYRSEVQAHlggsCEELRARLASHLRKLRKRL

**SP1:**

Amplified protein 96-231,

114008 1-279/391 TTDVTOQLNTLFDQKLGNINTYADDLQKLVKVPVAVGSGHLKETERVreeTQKELEDLRDnmphankvsgfGNNVKLOEHLRKYA...TDLQAGINAOQDHEKRLT

8392909 1-279/391 TTDVTOQLNTLFDQKLGNINTYADDLQKLVKVPVAVGSGHLKETERVreeTQKELEDLRDnmphankvsgfGNNVKLOEHLRKYA...TDLQAGINAOQDHEKRLT

6680702 1-278/394 TTDVTOQLNTLFDQKLGDASTYADGVHKKLVKVPVAVGSGHLKETERVreeTQKELEDLRDnmphankvsgfGNNVKLOEHLRKYA...VDLQDQINTQDHEKRLT

911892 1-279/435 TTDVTOQLNTLFDQKLGDASTYADGVHKKLVKVPVAVGSGHLKETERVreeTQKELEDLRDnmphankvsgfGNNVKLOEHLRKYA...VDLQDQINTQDHEKRLT

12836356 1-279/395 TTDVTOQLNTLFDQKLGDASTYADGVHKKLVKVPVAVGSGHLKETERVreeTQKELEDLRDnmphankvsgfGNNVKLOEHLRKYA...VDLQDQINTQDHEKRLT

1703311 1-279/395 TTDVTOQLNTLFDQKLGDASTYADGVHKKLVKVPVAVGSGHLKETERVreeTQKELEDLRDnmphankvsgfGNNVKLOEHLRKYA...VDLQDQINTQDHEKRLT

109575 1-279/391 TTDVTOQLNTLFDQKLGDASTYADGVHKKLVKVPVAVGSGHLKETERVreeTQKELEDLRDnmphankvsgfGNNVKLOEHLRKYA...VDLQDQINTQDHEKRLT

3645997 1-258/366 IAEITQKLNLTLSQNLGNISYAEELQKLVKVPVAVGSGHLKETERVreeTQKELEDLRDnmphankvsgfGNNVKLOEHLRKYA...DEVHQIGTWIRELQAKLS

3913046 1-258/362 TTDVTOQLNTLFDQKLGEVNTYADDLQKLVKVPVAVGSGHLKETERVreeTQKELEDLRDnmphankvsgfGNNVKLOEHLRKYA...DEVHQIGTWIRELQAKLS

2429913 1-243/401 TTDVTOQLNTLFDQKLGEVNTYADDLQKLVKVPVAVGSGHLKETERVreeTQKELEDLRDnmphankvsgfGNNVKLOEHLRKYA...DEVHQIGTWIRELQAKLS

461521 1-259/429 TTDVTOQLNTLFDQKLGEVNTYADDLQKLVKVPVAVGSGHLKETERVreeTQKELEDLRDnmphankvsgfGNNVKLOEHLRKYA...DEVHQIGTWIRELQAKLS

71797 1-259/396 TTDVTOQLNTLFDQKLGEVNTYADDLQKLVKVPVAVGSGHLKETERVreeTQKELEDLRDnmphankvsgfGNNVKLOEHLRKYA...DEVHQIGTWIRELQAKLS

114006 1-259/396 TTDVTOQLNTLFDQKLGEVNTYADDLQKLVKVPVAVGSGHLKETERVreeTQKELEDLRDnmphankvsgfGNNVKLOEHLRKYA...DEVHQIGTWIRELQAKLS



17/33

gl	sf_name	organism	molecular function	biological process
SF0	APOLIPOPROTEIN E	Mammals, Rodents, Primates	Apolipoprotein, Transfer/Carrier prot...	lipid and fatty acid transport, LIPID, FATTY ACID AND STEROID METABOLISM, lipid and fatty acid transport
SF1	APOLIPOPROTEIN A-IV	Mammals, Rodents, Primates	Apolipoprotein, Transfer/Carrier prot...	lipid and fatty acid transport, LIPID, FATTY ACID AND STEROID METABOLISM, lipid and fatty acid transport
SF2	APOLIPOPROTEIN A-I	Mammals, Rodents, Primates	Apolipoprotein, Transfer/Carrier prot...	lipid and fatty acid transport, LIPID, FATTY ACID AND STEROID METABOLISM, lipid and fatty acid transport
lipid and fatty acid transport, LIPID, FATTY ACID AND STEROID METABOLISM, lipid and fatty acid transport, TRANSPORT, BLOOD CIRCULATION AND GAS EXCHANGE				

**Figure - 21A**

gl	sf_name	definition	organism
416629	APOLIPOPROTEIN E	APOLIPOPROTEIN E PRECURSOR (APO-E)	bos taurus
10644783	APOLIPOPROTEIN E	apolipoprotein E [Tupaia glis]	tupaia glis
3913071	APOLIPOPROTEIN E	APOLIPOPROTEIN E (APO-E)	saimiri sciureus
114040	APOLIPOPROTEIN E	APOLIPOPROTEIN E PRECURSOR (APO-E)	macaca fascicularis
114042	APOLIPOPROTEIN E	APOLIPOPROTEIN E PRECURSOR (APO-E)	papio hamadryas anubis
3913070	APOLIPOPROTEIN E	APOLIPOPROTEIN E (APO-E)	macaca mulatta
11066430	APOLIPOPROTEIN E	apolipoprotein E [Hylobates lar]	hylobates lar
178853	APOLIPOPROTEIN E	apolipoprotein E	homo sapiens
4557325	APOLIPOPROTEIN E	APOLIPOPROTEIN E PRECURSOR (APO-E)	homo sapiens
178849	APOLIPOPROTEIN E	apolipoprotein E	homo sapiens
11066425	APOLIPOPROTEIN E	apolipoprotein E [Pongo pygmaeus]	pongo pygmaeus
11034803	APOLIPOPROTEIN E	apolipoprotein-E [Pan troglodytes]	pan troglodytes
11066420	APOLIPOPROTEIN E	apolipoprotein E [Gorilla gorilla]	gorilla gorilla
114008	APOLIPOPROTEIN A-IV	APOLIPOPROTEIN A-IV PRECURSOR (APO-...)	rattus norvegicus
8392909	APOLIPOPROTEIN A-IV	apolipoprotein C-IV [Rattus norvegicus]	rattus norvegicus
6680702	APOLIPOPROTEIN A-IV	apolipoprotein A-IV [Mus musculus]	mus musculus
191889	APOLIPOPROTEIN A-IV	apolipoprotein A-IV	mus musculus castaneus
12836356	APOLIPOPROTEIN A-IV	putative [Mus musculus]	mus musculus
1703331	APOLIPOPROTEIN A-IV	APOLIPOPROTEIN A-IV PRECURSOR (APO-...)	mus musculus
109575	APOLIPOPROTEIN A-IV	apolipoprotein A-IV precursor - mouse (str...	mus musculus
3645997	APOLIPOPROTEIN A-IV	apolipoprotein AIV [Gallus gallus]	gallus gallus
3913046	APOLIPOPROTEIN A-IV	APOLIPOPROTEIN A-IV PRECURSOR (APO-...)	sus scrofa
2492913	APOLIPOPROTEIN A-IV	APOLIPOPROTEIN A-IV PRECURSOR (APO-...)	papio hamadryas anubis
461521	APOLIPOPROTEIN A-IV	APOLIPOPROTEIN A-IV PRECURSOR (APO-...)	macaca fascicularis
71797	APOLIPOPROTEIN A-IV	apolipoprotein A-IV precursor - human	homo sapiens
114006	APOLIPOPROTEIN A-IV	APOLIPOPROTEIN A-IV PRECURSOR (APO-...)	homo sapiens
4502151	APOLIPOPROTEIN A-IV	apolipoprotein A-IV precursor [Homo sapie...	homo sapiens
11440019	APOLIPOPROTEIN A-IV	apolipoprotein A-IV precursor [Homo sapie...	homo sapiens
6686379	APOLIPOPROTEIN A-I	APOLIPOPROTEIN A-I PRECURSOR	
3913050	APOLIPOPROTEIN A-I	APOLIPOPROTEIN A-I PRECURSOR (APO-AI)	danio rerio
113998	APOLIPOPROTEIN A-I	APOLIPOPROTEIN A-I PRECURSOR (APO-AI)	salmo salar
85586	APOLIPOPROTEIN A-I	apolipoprotein A-I precursor - Atlantic salmon	salmo salar
6686364	APOLIPOPROTEIN A-I	APOLIPOPROTEIN A-I-1 PRECURSOR (APO-...)	oncorhynchus mykiss
6686385	APOLIPOPROTEIN A-I	APOLIPOPROTEIN A-I-2 PRECURSOR (APO-...)	oncorhynchus mykiss
6686389	APOLIPOPROTEIN A-I	APOLIPOPROTEIN A-I PRECURSOR	salmo trutta
3121750	APOLIPOPROTEIN A-I	APOLIPOPROTEIN A-I PRECURSOR (APO-AI)	anas platyrhynchos
627301	APOLIPOPROTEIN A-I	apolipoprotein A-I - duck	anas platyrhynchos
5902793	APOLIPOPROTEIN A-I	APOLIPOPROTEIN A-I PRECURSOR (APO-AI)	coturnix japonica

**Figure - 21B**

BEST AVAILABLE COPY



**BEST AVAILABLE COPY**

19/33

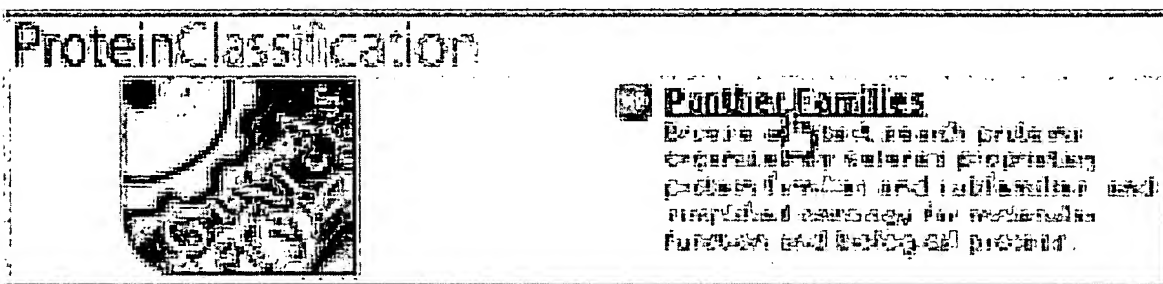


Figure - 23

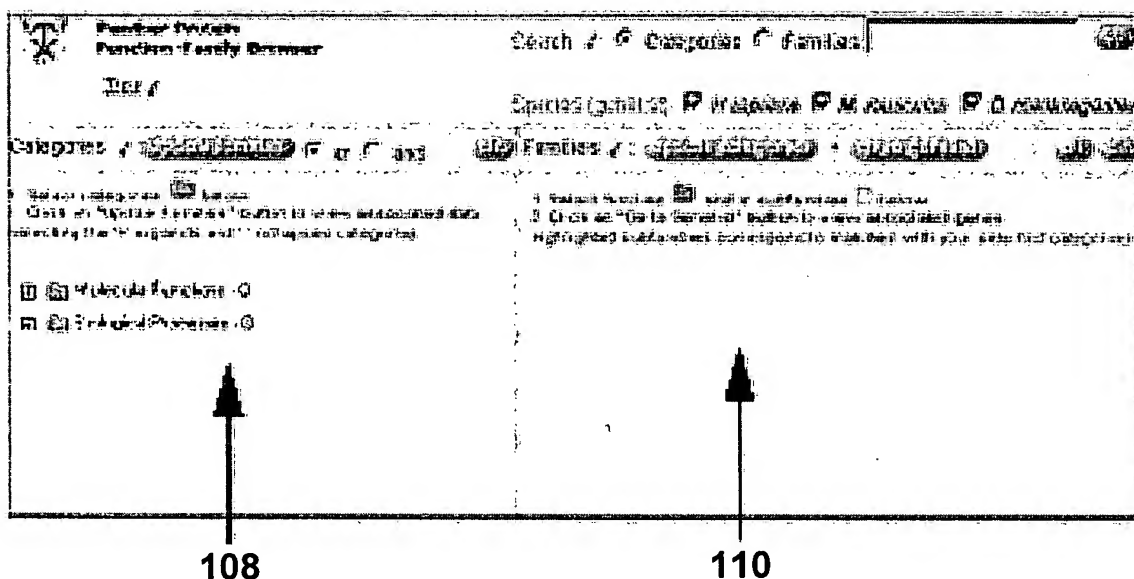
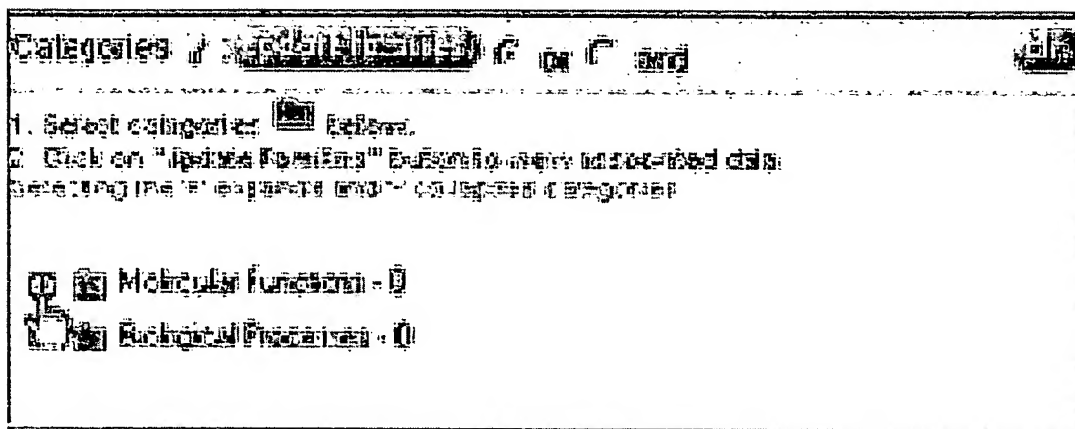


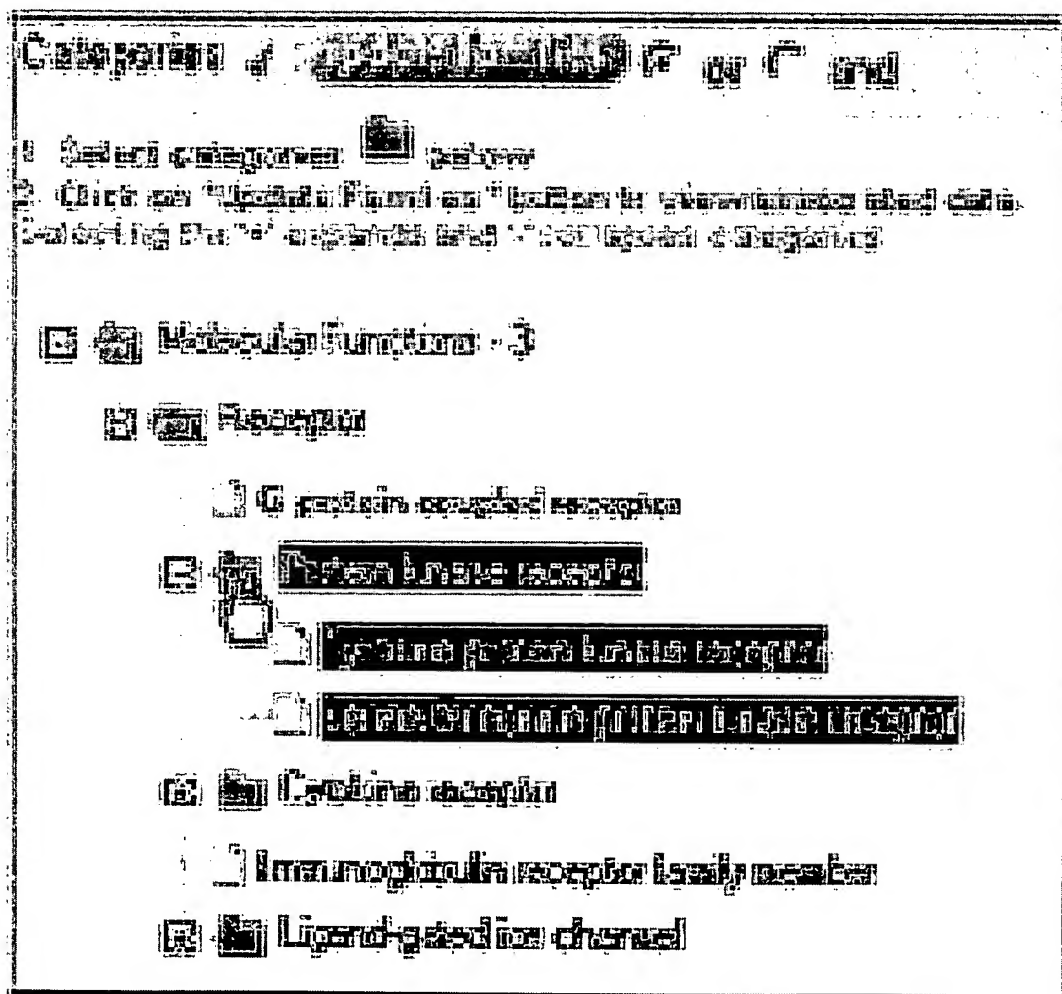
Figure - 24

BEST AVAILABLE COPY

20/33



**Figure - 25**



**Figure - 26**

BEST AVAILABLE COPY



22/33

116

Categories: **Update Families** of **or** **and**

1. Select categories ☒ below.

2. Click on "Update Families" button to view associated data.  
 Selecting the "or" operator and "or" categories categories.

☒ ☒ Molecular Function: 3

☒ ☒ Receptor

☐ G protein coupled receptor

☒ ☒ Pattern based receptor

☐ Pattern based receptor

☐ Pattern based receptor

☒ ☒ Cytokine receptor

☐ Immunoglobulin receptor family member

☒ ☒ Ligand-gated ion channel

**Figure - 29**

Categories: **Update Families** of **or** **and**

1. Select categories ☒ below.

2. Click on "Update Families" button to view associated data.  
 Selecting the "or" operator and "or" categories categories.

☒ ☒ Molecular Function: 3

☒ ☒ Receptor

☐ G protein coupled receptor

☒ ☒ Pattern based receptor

☐ Pattern based receptor

☐ Pattern based receptor

☒ ☒ Cytokine receptor

☐ Immunoglobulin receptor family member

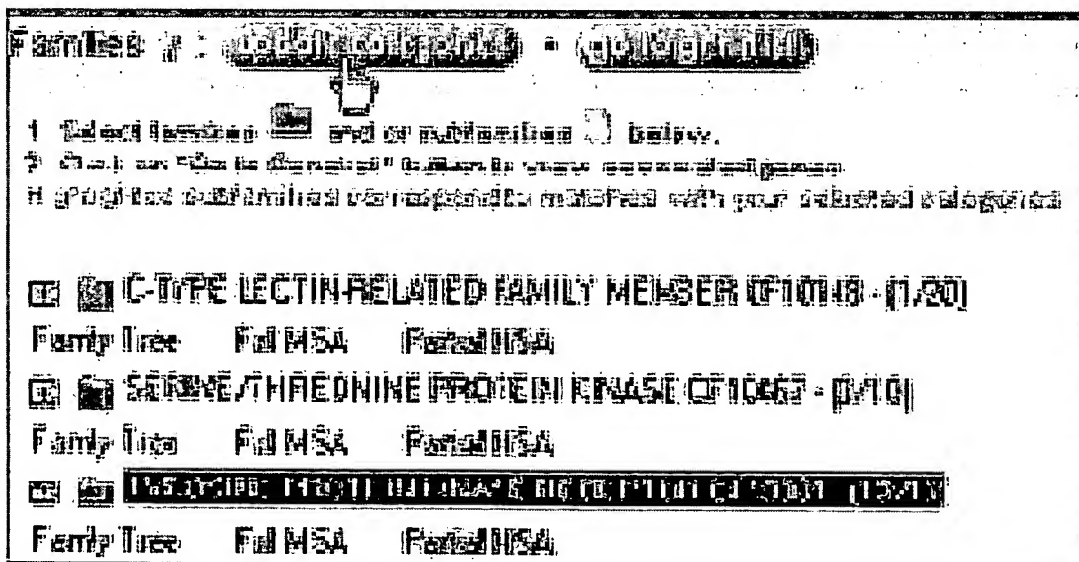
☒ ☒ Ligand-gated ion channel

**Figure - 30**

BEST AVAILABLE COPY





**Figure - 31**





**Figure - 32**

24/33

Families : **CELLULOSE** - **CELLULOSE**

1. Select families  and/or subfamilies  below.  
 2. Click on "Go to General" button to view associated pages.  
 Highlighted subfamilies correspond to matches with your selected categories

☒  C-TYPE LECTIN-RELATED FAMILY MEMBER CF10118 - (1/20)  
 Family Tree Full MSA Partial MSA

☒  SERINE/THREONINE PROTEIN KINASE CF1047 - (2/10)  
 Family Tree Full MSA Partial MSA






☒  TYROSINE KINASE RECEPTOR CF11301 - (1/30)  
 Family Tree Full MSA Partial MSA


Figure - 33

Families : **CELLULOSE** - **CELLULOSE**

1. Select families  and/or subfamilies  below.  
 2. Click on "Go to General" button to view associated pages.  
 Highlighted subfamilies correspond to matches with your selected categories

☒  C-TYPE LECTIN-RELATED FAMILY MEMBER CF10118 - (1/20)  
 Family Tree Full MSA Partial MSA

☒  SERINE/THREONINE PROTEIN KINASE CF1047 - (2/10)  
 Family Tree Full MSA Partial MSA

☒  TYROSINE PROTEIN KINASE RECEPTOR CF11301 - (1/30)  
 Family Tree Full MSA Partial MSA


☒  CELL ADHESION MOLECULE-RELATED CF11553 - (3/24)

Figure - 34

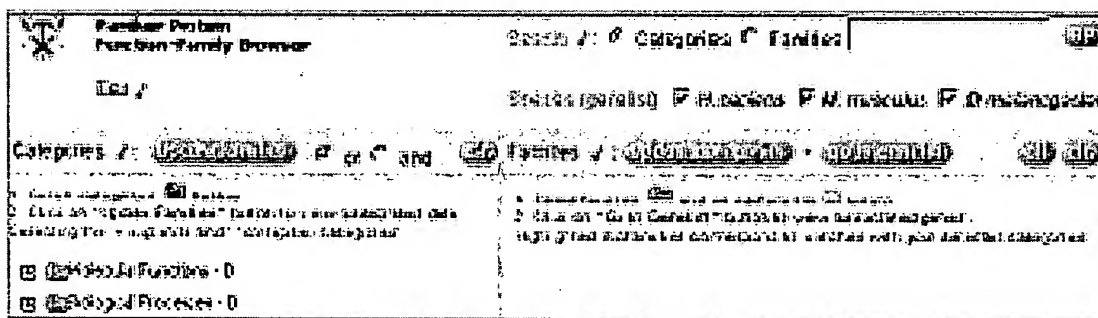
BEST AVAILABLE COPY



**Figure - 35**

**Figure - 36**


**Figure - 37**









**Figure - 38**

**Figure - 39**

**Categories of Protein Families** of 1 and 2

1. Select categories  below

2. Click on "Update Families" button to view associated data.  
Selecting the 1st expands and "freezes" categories

- ☒  Protein kinase receptor
  - ☐ Gamma protein kinase receptor
  - ☐ Beta, Gamma protein kinase receptor
- ☒  Cytochrome receptor
  - ☐ Iron-sulfur cluster receptor family members
- ☒  Ligand-gated ion channel
  - ☐ Human human receptor
  - ☐ Other receptor
- ☒  Signaling molecule
- ☒  Kinase
- ☒  Protein kinase
  - ☐ Gamma protein kinase receptor
  - ☐ Non-integrated protein protein kinase
  - ☐ Iron, Gamma protein kinase receptor
  - ☐ Gamma protein kinase receptor protein kinase
  - ☐ Gamma protein kinase receptor
  - ☐ Gamma protein kinase
  - ☐ Gamma protein kinase
  - ☐ Gamma protein kinase
  - ☐ Other kinase

**Figure - 40**

28/33

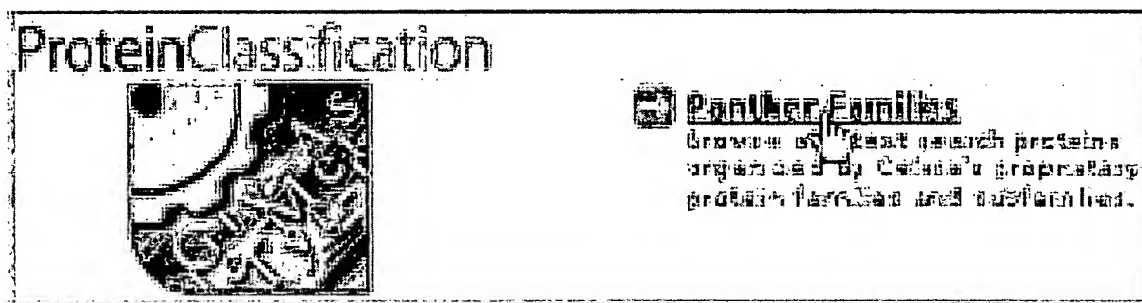


Figure - 41

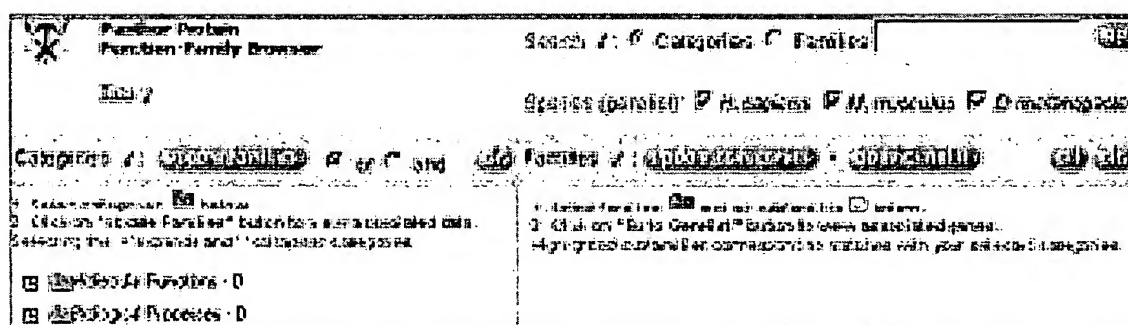


Figure - 42

BEST AVAILABLE COPY

Search Categories Families **1-cell receptor**

**Figure - 43**

1. Select families ☒ and/or subfamilies ☐ below.  
2. Click on "Go to Classification" to view associated series.  
3. Highlighted subfamilies correspond to matches with your selected categories.

☒ ☒ T-CELL RECEPTOR BETA CHAIN (CF10442) (13/7)  
Family Tree Full MSA Partial MSA

☒ ☒ T-CELL RECEPTOR BETA CHAIN (CF10443) (12/7)  
Family Tree Full MSA Partial MSA

☒ ☒ T-CELL RECEPTOR BETA CHAIN (CF10450) (13/7)  
Family Tree Full MSA Partial MSA

☒ ☒ T-CELL RECEPTOR BETA CHAIN (CF10452) (11/7)  
Family Tree Full MSA Partial MSA

☒ ☒ T-CELL RECEPTOR ALPHA CHAIN (CF10475) (11/10)  
Family Tree Full MSA Partial MSA

☒ ☒ T-CELL RECEPTOR BETA CHAIN (CF10493) (15/7)  
Family Tree Full MSA Partial MSA

☒ ☒ T-CELL RECEPTOR BETA CHAIN (CF10515) (15/7)  
Family Tree Full MSA Partial MSA

☒ ☒ T-CELL RECEPTOR DELTA CHAIN (CF10550) (13/7)  
Family Tree Full MSA Partial MSA

☒ ☒ T-CELL RECEPTOR BETA CHAIN (CF10930) (11/7)  
Family Tree Full MSA Partial MSA

☒ ☒ T-CELL RECEPTOR BETA CHAIN (CF11248) (12/7)  
Family Tree Full MSA Partial MSA

☒ ☒ T-CELL RECEPTOR GAMMA CHAIN (CF11406) (15/7)  
Family Tree Full MSA Partial MSA

☒ ☒ T-CELL RECEPTOR BETA CHAIN (CF10447) (12/7)  
Family Tree Full MSA Partial MSA

☒ ☒ T-CELL RECEPTOR BETA CHAIN (CF10449) (14/7)  
Family Tree Full MSA Partial MSA

☒ ☒ T-CELL RECEPTOR BETA CHAIN (CF10495) (12/7)

**BEST AVAILABLE COPY**

**Figure - 44**

Species (genlist): ☐ H. sapiens ☐ M. musculus ☐ D. melanogaster

Families: ☒ C-type lectin genes ☐ C-type lectin-like genes

1. Select families ☒ and/or subfamilies ☐ below.  
2. Click on "Go to Genlist" button to view assigned genes.  
Highly conserved sites collected in previous years plus selected C-type lectin

☒ C-TYPE LECTIN-RELATED FAMILY MEMBER CPT148 (1/20)

Family Tree FullMSA PartialMSA

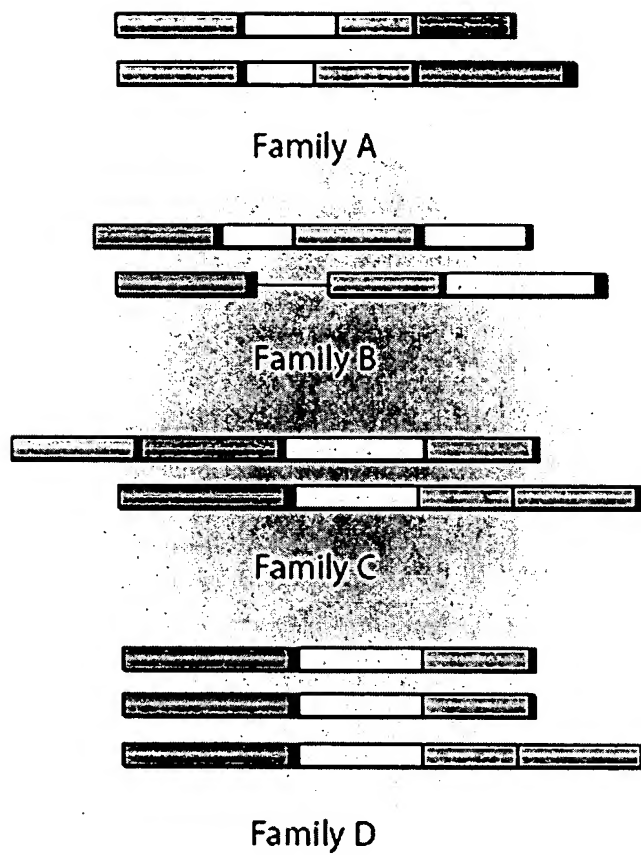
**Figure - 45**

[illegible]

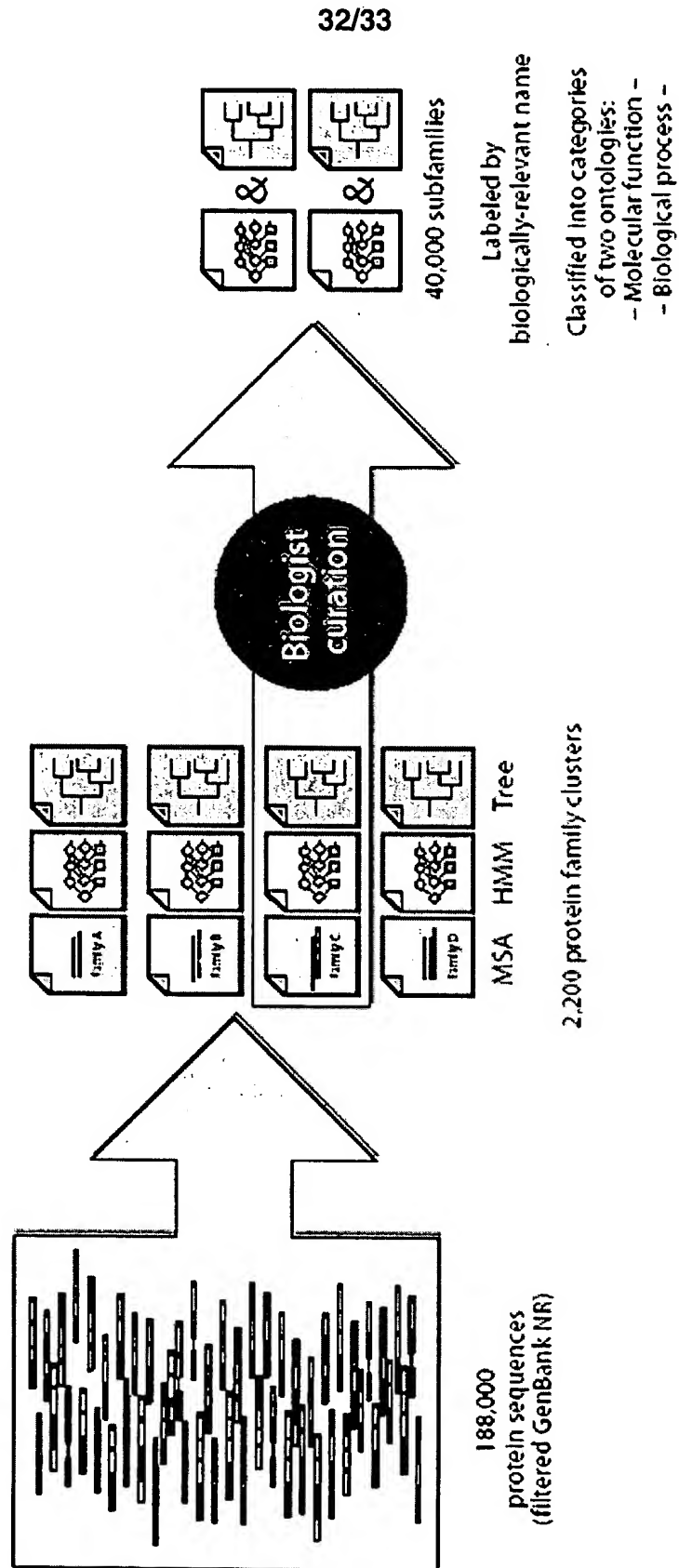
**Figure - 46**

**BEST AVAILABLE COPY**

31/33



**Figure - 47**



**Figure - 48**

BEST AVAILABLE COPY





**Figure - 49**